REMARKS

Claims 1 – 28 are now pending in the application. The Examiner is respectfully requested to reconsider and withdraw the rejection in view of the amendments and remarks contained herein.

REJECTION UNDER 35 U.S.C. § 102

Claim 1 – 8 and 14 – 28 stand rejected under 35 U.S.C. § 102(b) as being anticipated by Hamburg et al. (U.S. Pat. No. 5,255,512). This rejection is respectfully traversed.

Claims 1 and 14 each include monitoring a secondary fuel trim based on an outlet signal of an outlet oxygen sensor and indicating a fault status if the secondary fuel trim outside of a fuel trim limit range and the outlet signal is out of a diagnostic range. Hamburg fails to teach or suggest monitoring a secondary fuel trim based on an outlet signal of an outlet oxygen sensor and indicating a fault status if the secondary fuel trim outside of a fuel trim limit range and the outlet signal is out of a diagnostic range.

The present invention provides a system and method to detect air-to-fuel (A/F) ratio imbalances and/or exhaust leaks using a traditional A/F control system. More specifically, the A/F control system regulates fuel flow based on an inlet O_2 signal. The inlet O_2 sensor signal is adjusted by a bias or offset that is based on the outlet O_2 sensor signal.

The present invention departs from the traditional A/F control systems in that it provides a diagnostic to determine whether an A/F imbalance and/or exhaust leak condition is present. More specifically, the outlet O_2 sensor signal is limited by a maximum offset or bias to maintain it within a control range that corresponds to optimum emissions system performance. A diagnostic range for the outlet O_2 sensor signal is also provided, whereby if the outlet O2 sensor signal is outside of the diagnostic range, the diagnostic indicates an engine fault for that data sample.

Hamburg discloses a traditional A/F control system. More specifically, the A/F control system of Hamburg includes a first feedback loop having an upstream exhaust gas oxygen (EGO) sensor and an air fuel bias table, and a second feedback loop having a downstream EGO sensor and a trim signal (see Col. 2, Lines 24 – 44). The air

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fuel bias table contains correction values to shift a closed-loop control point (see Col. 2, Lines 45 – 48). For example, if the downstream EGO sensor detects a lean condition, the closed-loop control point is corrected based on the air fuel bias table to switch to a rich condition, and vice-versa. The A/F control system of Hamburg updates the values in the air fuel bias table based on the trim signal (see Col. 2, Line 55 – Col. 3 – Line23).

Besides disclosing a traditional A/F control system, Hamburg fails to teach or suggest a diagnostic system for detecting an A/F imbalance and/or an exhaust leak. More specifically, Hamburg fails to teach or suggest monitoring a secondary fuel trim based on an outlet signal of an outlet oxygen sensor and indicating a fault status if the secondary fuel trim outside of a fuel trim limit range and the outlet signal is out of a diagnostic range.

Claims 1 – 8 and 15 – 21 each ultimately depend from one of claims 1 and 14 which define over the prior art, as discussed in detail above. Therefore, claims 1 – 8 and 15 – 21 also define over the prior art for at least the reasons stated with respect to claims 1 and 14, and reconsideration and withdrawal of the rejections are respectfully requested.

Claim 22 includes monitoring a secondary fuel trim based on an outlet signal of an outlet oxygen sensor, monitoring a bias of an inlet oxygen sensor and indicating a pass status if an inlet sensor bias is within the bias limits and the outlet signal is within a control range. Hamburg fails to teach or suggest monitoring a secondary fuel trim based on an outlet signal of an outlet oxygen sensor, monitoring a bias of an inlet oxygen sensor and indicating a pass status if an inlet sensor bias is within the bias limits and the outlet signal is within a control range.

As discussed in detail above, Hamburg discloses a traditional A/F control system including an air fuel bias table that is periodically updated based on a trim signal. Hamburg fails to disclose a diagnostic system based on signals generated by the A/F control system. Therefore, Hamburg fails to teach or suggest indicating a pass status if an inlet sensor bias is within the bias limits and the outlet signal is within a control range. Accordingly, reconsideration and withdrawal of the rejection are respectfully requested.

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Claims 23 – 28 each ultimately depend from claim 22 which defines over the prior art, as discussed in detail above. Therefore, claims 23 – 28 also define over the prior art for at least the reasons stated with respect to claim 22, and reconsideration and withdrawal of the rejections are respectfully requested.

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OTHER CLAIM AMENDMENTS

Claims 4 and 22 have been amended herein to correct a grammatical error. No new matter has been entered.

ALLOWABLE SUBJECT MATTER

Applicant thanks the Examiner for recognizing the allowable subject-matter of claims 9 – 13. Applicant looks forward to favorable consideration of the remaining claims in view of the discussion herein.

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CONCLUSION

It is believed that all of the stated grounds of rejection have been properly traversed, accommodated, or rendered moot. Applicant therefore respectfully requests that the Examiner reconsider and withdraw all presently outstanding rejections. It is believed that a full and complete response has been made to the outstanding Office Action, and as such, the present application is in condition for allowance. Thus, prompt and favorable consideration of this amendment is respectfully requested. If the Examiner believes that personal communication will expedite prosecution of this application, the Examiner is invited to telephone the undersigned at (313) 665-4969.

If for some reason any fee needs to be paid charge Deposit Account No. 07-0960.

Respectfully submitted,

Dated: 6-22-05

By: _____

Christopher Devries
Reg. No. 44,654

GENERAL MOTORS CORPORATION
Legal Staff
Mail Code 482-C23-B21
P.O. Box 300
Detroit, MI 48265-300

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